REMARKS

Claims 1-30 are pending in the Application. The Specification is objected to. Claims 19 and 25 are objected to. Claims 21-25 are rejected under 35 U.S.C. §101. Claims 19-24 are rejected under 35 U.S.C. §103(a).

Applicants cancelled claims 19-25 without prejudice or disclaimer. Hence, claims 1-18 and 26-30 are pending. Applicants reserve the right to file a continuation application to capture the subject matter of cancelled claims 19-25. Applicants note that claims 19-25 were only cancelled to expedite the issuance of the allowable claims. IBM requested Applicants' attorney to expedite the issuance of the allowable claims in order to meet their required quota of issued patents. The cancellation of claims 19-25 is not to be interpreted as Applicants agreeing with the Examiner that the above-stated rejections are proper. In fact, Applicants believe these rejections are improper. Applicants for the record will briefly explain why these rejections are improper further below.

Hence, claims 1-18 and 26-30 are allowable and Applicants respectfully request the Examiner to issue a notice of allowance allowing claims 1-18 and 26-30.

I. RESPONSE TO EXAMINER'S SUMMARY OF TELEPHONE CONVERSATION WITH APPLICANTS' ATTORNEY:

The Examiner states:

> Should the Examiner interpret this to mean that Applicant tacitly admits that Holzle does teach all the limitations except the multi-threading aspect that is taught by Bacon. Office Action, page 2.

Applicants respectfully assert that in Applicants' Appeal Brief, Applicants were not tacitly admitting that Holzle teaches all of the limitations except the multi-threading aspect. The Examiner has a burden of establishing a *prima facie* case of obviousness. Since the Examiner had not established a *prima facie* case of obviousness in rejecting claims 19-20 by using a disqualified prior art reference, Applicants did not have to address each and every limitation that is not taught by Holzle.

Further, the Examiner states:

> In response to Examiner's suggestion, Applicant's representative asserted that just-in-time (JIT) is JAVA and JAVA is objected-oriented (OO) programming language. Therefore, according to Applicant's representative, adding JIT would not distinguish the instant

> claims over Holzle. In response, the Examiner has indicated to Applicant's representative in a telephonic message that if applicant's representative asserts that adding JIT would not distinguish claims 20 and 21 over Holzle then instant claim 19 would no longer be allowable over Holzle because Applicant's representative infers that Holzle teaches the JIT feature. Office Action, page 3.

Applicants respectfully assert that Applicants' attorney did not assert that adding the limitation of a just-in-time compiler in claims 20 and 21 would not distinguish these claims over Holzle. That is an incorrect statement. Instead, Applicants' attorney asserted that claims 20 and 21 as currently written are not disclosed by Holzle and hence adding any further limitations (including the limitation of a just-in-time compiler) to claims 20 and 21 are not necessary.

Furthermore, Applicants' attorney did not suggest or intimate or directly state that Holzle teaches the just-in-time feature. There is no language in Holzle that suggests using a just-in-time compiler. Neither is there any language in Holzle that mentions the Java™ programming language. Neither has the Examiner pointed to any language in Holzle that teaches or suggests using a just-in-time compiler. The Examiner is merely relying upon his own subjective opinion which is inappropriate in establishing a *prima facie* case of obviousness. *In re Lee*, 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002).

Further, claim 19 is allowable. There are limitations in claim 19 not taught or suggested by Holzle as well as in the other references cited by the Examiner in this case.

The Examiner further states:

> The Examiner further indicated to applicant's representative that the OO SELF programming environment was known in 1990 (see Holzle, section 3.3, lines 3-4) whereas JAVA was first introduced in 1995. The Examiner further stated that inferring that OO SELF program is the same as JAVA is equivalent to saying that C++ is the same as JAVA because C++ is also an OO programming language, which is fundamentally incorrect. Office Action, page 3.

Applicants' attorney agrees that the Java™ programming language is a different programming language than C++, or Eiffel or Smalltalk or Modula 3, etc. These are all different object oriented languages. Applicants' attorney did not suggest, intimate

or directly state that the Java™ programming language is the same as C++. They are different object oriented programming languages.

II. OBJECTIONS TO THE SPECIFICATION:

The Examiner has objected to the Specification for not properly using trademarks in the Specification. Office Action, page 4. In particular, the Examiner noted that the trademark of Java™ was not properly used on page 3, line 9 of the Specification. Office Action, page 4. Applicants amended the Specification accordingly. Applicants respectfully request the Examiner to withdraw the objections to the Specification.

III. CLAIM OBJECTIONS:

The Examiner has objected to claims 19 and 25 for typographical mistakes. Office Action, page 4. Applicants agree that there are typographical mistakes in claims 19 and 25; however, Applicants cancelled claims 19 and 25 in order to expedite the issuance of claims 1-18 and 26-30. Accordingly, the objections to claims 19 and 25 are moot.

IV. REJECTIONS UNDER 35 U.S.C. §101:

The Examiner has rejected claims 21-25 under 35 U.S.C. §101 as being directed to non-statutory subject matter. Office Action, page 5. The Examiner further states:

> In this instance, the language of the claim raises a question as to whether the claim is directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practical application producing a useful, concrete and tangible result to form the basis of statutory subject matter under 35 USC §101. Furthermore, the Office's interpretation of this claim is that it does not expressly or implicitly require performance of any of the steps by a machine such as a general-purpose digital computer. Structure will not be read into the claims for the purpose of the statutory subject matter analysis even though the steps might be capable of being performed by a machine. Office Action, pages 5-6.

Applicants respectfully assert that claims 21-25 are directed to statutory subject matter. Claims 21-25 are not directed to an abstract idea as asserted by the Examiner. Instead, claim 21 is directed to a method of using a polymorphic inline cache which

includes steps such as calling a method, locking a slot of the polymorphic inline cache or executing the slot of the polymorphic inline cache.

Further, the implied assertion that the steps in claim 21 can be performed by a human is incorrect. A human cannot call a method having an object type from an executing object oriented program. Neither can a human lock a slot of the polymorphic inline cache with a call to the method of the object type. Neither can a human execute the slot of the polymorphic inline cache. The steps in claim 21 require performance of a machine.

Further, the Examiner seems to be misapplying the rule in determining whether a claim is directed to statutory subject matter. The Congressional intent is that any new and useful process, machine, manufacture or composition of matter under the sun that is made by man is the proper subject matter of a patent. M.P.E.P. §2106. The subject matter courts have found to be outside the four statutory categories is limited to subject matter that is not a practical application or use of an idea, a law of nature or a natural phenomenon. *See, e.g., Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874); M.P.E.P. §2106. Claim 21 is directed to a method of using a polymorphic inline cache. Claim 21 does not include subject matter outside of the four statutory categories.

Applicants respectfully contend that the claimed inventions in claims 21-25 satisfy the test for statutory subject matter recited in *In re Alappat*, and repeated in *State Street Bank & Trust Co. v. Signature Financial Group*, and *AT&T Corp. v. Excel Communications, Inc. In re Alappat*, 33 F.3d 1526, 31 U.S.P.Q.2d 1545 (Fed. Cir. 1994); *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 47 U.S.P.Q.2d 1596 (Fed. Cir. 1998); *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1526, 50 U.S.P.Q.2d 1547 (Fed. Cir. 1999). The claimed inventions produce a useful, concrete and tangible result in, *inter alia*, generating an alternative form of transmitted environmental data, e.g., displaying a flower on a computer screen instead of providing the smell of a flower.

The essential inquiry under *In re Alappat* is to determine whether the claimed subject matter as a whole is directed to a disembodied mathematical concept representing nothing more than a "law of nature" or an "abstract idea" or if, in

contrast, the mathematical concept has been reduced to some practical application rendering it useful. *AT&T Corp.*, 172 F.2d at 1357, 50 U.S.P.Q.2d at 1451 (citing *In re Alappat*, 33 F.3d at 1543, 31 U.S.P.Q.2d at 1556-57). Moreover, in making the determination whether the claimed subject matter as a whole is a disembodied mathematical concept or if the concept has been reduced to some practical application rendering it useful, the claims must be construed in the light of the Specification. *See, AT&T Corp.*, 172 F.3d at 1357, 50 U.S.P.Q.2d at 1451 (stating that more than an abstract idea was claimed in *In re Alappat* because the "claimed invention as whole was directed toward forming a specific machine that produced the useful, concrete and tangible result of a *smooth wave form display*") (emphasis supplied). The single claim at issue in *In re Alappat* was directed to a rasterizer and recited elements in means plus function form. *In re Alappat*, 33 F.3d at 1540, 31 U.S.P.Q.2d at 1555. Additionally, none of the limitations recited in the claim at issue expressly claimed a "smooth wave form display". Indeed, the concrete, useful and tangible result relied upon in *In re Alappat*, namely, a smooth uniform display, appears in the background of the invention. *Kuriappan P. Alappat, et al.,* U.S. Patent No. 5,440,676 (col. 1, lines 9-10).

Likewise, in *AT&T Corp.*, the useful, nonabstract result relied upon in holding that the claimed invention was directed to statutory subject matter was that the PIC indicator therein held information about the call recipients PIC, which facilitated differential billing of long-distance calls made by a subscriber. *AT&T Corp*, 172 F.3d 1358, 50 U.S.P.Q.2d at 1452. However, the claim at issue in *AT&T Corp.* was directed to a method including the steps of generating a message record for an interexchange call, and including in the message record a PIC indicator having a value which is a function of whether or not the interexchange carrier associated with the terminating subscriber is a predetermined one of the interexchange carriers. *AT&T Corp.*, 172 F.3d at 1354, 50 U.S.P.Q.2d at 1449. Again, there was no express or explicit claim limitation directed to the useful, concrete, and tangible result relied upon in determining that the aforesaid claim was directed to statutory subject matter. *See, Id.* The relied upon PIC indicator that facilitates differential billing of long-distance calls appears, *inter alia*, in the summary of the invention. *Gerard P. Doherty, et al.*, U.S. Patent No. 5,333,184, col. 1, line 66 through col. 2, line 3.

Likewise, in *State Street Bank & Trust v. Signature Financial Group*, a useful and concrete and tangible result not expressed in an explicit limitation in the claim at issue was relied upon in holding that the claim was directed to statutory subject matter. *See, State Street Bank*, 149 F.3d at 1373, 47 U.S.P.Q.2d at 1601 (holding that the transformation of data by the claimed data processing system produced a useful, concrete and tangible result, namely a final share price momentarily fixed for recording and reporting purposes). The claimed invention recited no limitation directed to either a final share price or means for momentarily fixing the final share price for recording and reporting purposes. *See, State Street Bank*, 149 F.3d at 1371, 47 U.S.P.Q.2d at 1599. Indeed, the relied upon useful, concrete and tangible result in *State Street Bank*, namely a final share price momentarily fixed, is not explicitly recited in the *State Street Bank* patent, but is effectively a distillation of the Summary of the Invention. *See, R. Todd Boes*, U.S. Patent No. 5,193,056, col. 4, lines 36-61. Thus, it is beyond peradventure that when judging the claimed subject matter as a whole to determine patentability under 35 U.S.C. § 101, the claims must be construed in the light of the specification.

In short, the essential inquiry under 35 U.S.C §101 is whether there is a practical application, or result. *State Street Bank*, 149 F.3d at 1373, 47 U.S.P.Q.2d at 1601. As discussed above, claim 21 is directed to a method for using a polymorphic inline cache. Claim 21 is directed to a practical result, namely calling a method having an object type; locking a slot of the polymorphic inline cache with a call to the method of the object type; and executing the slot of the polymorphic inline cache. Hence, the subject matter of claims 21-25 has a practical application within the four statutory categories and is not a practical application or use of an idea, a law of nature or a natural phenomenon.

Thus, for at least the aforesaid reasons, Applicants respectfully contend that claims 21-25 constitute statutory subject matter. Applicants respectfully assert the rejections of claims 21-25 under 35 U.S.C. §101 are in error.

V. REJECTIONS UNDER 35 U.S.C. §103(a):

The Examiner has rejected claims 19 and 20 under 35 U.S.C. §103(a) as being unpatentable over Holzle et al. ("Optimizing Dynamically-Typed Object-Oriented Languages with Polymorphic Inline Caches") (hereinafter "Holzle"). Further, the Examiner rejects claims 21-24 under 35 U.S.C. §103(a) as being unpatentable over Lindholm-Yellin, The Java™ Virtual Machine Specification ("JVM Spec") in view of Holzle. Applicants cancelled claims 19-24 and hence the rejections to claims 19-24 are moot. However, these claims were cancelled only to expedite the issuance of claims 1-18 and 26-30 and not in response to the cited art. These rejections are improper for at least the reasons set forth below. Applicants have not included all of the reasons as to why these rejections are improper for the sake of brevity.

A. Claim 19 is patentable over Holzle.

The Examiner admits that Holzle does not teach a just-in-time compiler for compiling object oriented applications for execution, as recited in claim 19. Office Action, page 7. The Examiner takes official notice that a JIT compiler is well known in the art. Office Action, page 7. While a JIT compiler is known today, the Examiner has not provided any evidence for modifying Holzle to have a just-in-time compiler for compiling object oriented applications for execution, as recited in claim 19. In order to establish a *prima facie* case of obviousness, the Examiner must provide a suggestion or motivation for modifying a reference to include a missing limitation. M.P.E.P. §2142-2143. The Examiner simply states that the motivation is "to produce more efficient code." This is not a motivation for modifying Holzle to have a just-in-time compiler for compiling object oriented applications for execution. The Examiner has not provided any evidence that Holzle needs to have a JIT compiler in order to produce more efficient code. There are many ways to produce more efficient code. The Examiner has not indicated as to why Holzle needs to have a JIT compiler as opposed to some other method or means to produce more efficient code. Hence, the Examiner's motivation is insufficient in establishing a *prima facie* case of obviousness in rejecting claim 19.

Further, Holzle does not teach or suggest "a polymorphic inline cache created by said just-in-time compiler, said polymorphic inline cache implementing a lockable slot for each individual object type to a polymorphic call site in the application" as

recited in claim 19. The Examiner cites sections 3.1 and 3.2 of Holzle as teaching the above-cited claim limitation. Office Action, pages 6-7. Applicants respectfully traverse.

Holzle instead teaches that with PICs, the miss handler constructs a short stub routine and rebinds the call to this stub routine. Page 4. Holzle further teaches that the stub checks if the receiver is either a rectangle or a circle and branches to the corresponding method. Page 4. Holzle further teaches that the stub can branch directly to the method's body because the receiver type has already been verified. Page 4. Holzle further teaches that if the cache misses again, the stub routine will simply be extended to handle the new case. Page 4. Hence, Holzle teaches a stub that determines if the receiver is either a rectangle or a circle and branches to the corresponding method as illustrated in Figure 3.

There is no language in Holzle that teaches a polymorphic inline cache created by a JIT compiler, as recited in claim 19. While the Examiner has stated that a JIT compiler is well known in the art, the Examiner has not provided any motivation or suggestion for modifying Holzle to have a polymorphic inline cache created by a JIT compiler. In order to establish a *prima facie* case of obviousness, the Examiner is required to provide a suggestion or motivation for modifying Holzle to include the missing limitation. M.P.E.P. §§2142-2143. Since the Examiner has not provided a motivation for modifying Holzle to have a polymorphic inline cache created by a JIT compiler, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 19. M.P.E.P. §§2142-2143.

Further, there is no language in Holzle that teaches a polymorphic inline cache that implements a lockable slot, as recited in claim 19. As understood by the Applicants, the Examiner is focusing on the language in Holzle that teaches that the inline cache would be extended if there is a cache miss. This does not imply the teaching of a lockable slot. Applicants direct the Examiner's attention to the Background of the Specification (pages 5-6) which specifically discusses extending the polymorphic inline cache upon a cache miss. The Examiner has not presented a basis in fact and/or technical reasoning to conclude that a lockable slot is taught by Holzle. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

That is, the Examiner must provide extrinsic evidence that must make clear that a lockable slot is taught by Holzle, and that it be so recognized for persons of ordinary skill. *See In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999). Since the Examiner has not provided such evidence, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 19. M.P.E.P. §2143.

B. Claim 20 is patentable over Holzle.

Furthermore, the Examiner has not addressed the limitation of "a polymorphic inline cache having a plurality of slots, each slot allocated to an object type of a method and locked to other object types of a polymorphic call site in the application" as recited in claim 20. In order to establish a *prima facie* case of obviousness, the Examiner must cite a reference or combination of references that teaches or suggests each of the claim limitations. M.P.E.P. §2143. Since the Examiner has not addressed each limitation of claim 20, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 20. M.P.E.P. §2143.

C. Claims 21-24 are patentable over JVM Spec in view of Holzle.

Applicants respectfully assert that JVM Spec and Holzle, taken singly or in combination, do not teach or suggest "calling a first method having a first object type from an executing object oriented program; locking a first slot of the polymorphic inline cache with a call to the first method of the first object type; and executing the first slot of the polymorphic inline cache" as recited in claim 21. The Examiner cites sections 8.12 and 8.13 of the JVM Spec as teaching the above-cited claim limitations except for a polymorphic inline cache. Office Action, page 8. The Examiner cites Holzle as teaching a polymorphic inline cache. Office Action, page 8. Applicants respectfully traverse.

The Examiner in his rejection has added the phrase "a main memory" following "slot" thereby adding limitations that are not recited in claim 21. The Examiner cannot add limitations that are not recited. M.P.E.P. §2145. Accordingly, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 21. M.P.E.P. §2143.

Further, Applicants could not identify any language in sections 8.12 and 8.13 of the JVM Spec as teaching the above-cited claim limitations (minus the aspect of a polymorphic inline cache). There is no language that teaches calling a method having an object type from an executing object oriented program. Neither is there any language that teaches locking a slot with a call to the method of the object type. Neither is there any language that teaches executing the slot.

Further, the Examiner admits that the JVM Spec does not teach the concept of a polymorphic inline cache. Office Action, page 8. The Examiner's motivation, as understood by the Applicants, for modifying the JVM Spec with Holzle to include the concept of a polymorphic inline cache is "to produce more efficient code." This is not a motivation for modifying the JVM Spec to use a polymorphic inline cache. The Examiner has not provided any evidence that the JVM Spec needs to use a polymorphic inline cache in order to produce more efficient code. Neither has the Examiner provided any evidence of there being a connection between producing more efficient code and using a polymorphic inline cache. Hence, the Examiner's motivation is insufficient in establishing a *prima facie* case of obviousness in rejecting claims 21-24.

Furthermore, claims 22-24 are patentable over the JVM Spec in view of Holzle for at least the reasons that claim 21 is patentable over the JVM Spec in view of Holzle.

Further, Applicants respectfully assert that none of the limitations in claim 22 are taught by the JVM Spec and Holzle, taken singly or in combination. The Examiner has not specifically addressed the differences between claims 22 and 21, e.g., calling a second method, locking a second slot), but instead refers the Applicants to the Examiner's rejection of claim 21. Office Action, page 9. The Examiner needs to cite a passage in either the JVM Spec or Holzle that teaches or suggests these differences in order to establish a *prima facie* case of obviousness. Thus, the Examine has not presented a *prima facie* case of obviousness in rejecting claim 22, since the Examiner is relying upon an incorrect, factual predicate in support of the rejection. *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998).

Further, Applicants respectfully assert that the JVM Spec and Holzle, taken singly or in combination, do not teach or suggest "wherein the first slot of the polymorphic inline cache is executed simultaneously with the second slot of the polymorphic inline cache" as recited in claim 23. The Examiner is essentially stating that this limitation is inherent in the JVM Spec. Office Action, page 9. The Examiner's rationale that the JVM Spec must inherently teach the above-cited claim limitation is in error.

The Examiner asserts that since the JVM Spec teaches locks and synchronization in the context of threads that the JVM Spec must necessarily teach the above-cited claim limitation in order to prevent multiple threads occupying the different slots. Office Action, page 9. This is one of the problems that the present invention was addressing as indicated in the Background (pages 6-7) of the Specification. The Examiner is essentially gleaning knowledge from the Specification (the problem that the present application is addressing). Any judgment on obviousness must not include knowledge gleaned from Applicants' disclosure. *In re McLaughlin*, 170 U.S.P.Q. 209, 212 (C.C.P.A. 1971). The Examiner then concludes that it is inherent that the JVM Spec must perform the above-cited claim limitation since it overcomes this problem as discussed in Applicants' specification. The Examiner is relying upon the Applicants' disclosure in support of his obviousness rejection which is improper. *Id.* Instead, the Examiner must provide a basis in fact and/or technical reasoning to support the assertion that the JVM Spec inherently teaches a first slot of a polymorphic inline cache that is executed simultaneously with a second slot of the polymorphic inline cache. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). That is, the Examiner must provide extrinsic evidence that must make clear that the JVM Spec inherently teaches a first slot of a polymorphic inline cache that is executed simultaneously with a second slot of the polymorphic inline cache, and that it be so recognized for persons of ordinary skill. *See In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999). The Examiner is merely relying upon his own subjective opinion which is insufficient. Since the Examiner has not provided such evidence, the Examiner has not presented a *prima facie* case of obviousness in rejecting claim 23. M.P.E.P. §2143.

Applicants respectfully assert that the JVM Spec and Holzle, taken singly or in combination, do not teach or suggest the limitations of claim 24 for the same rationale as mentioned in the previous paragraph.

VI. CONCLUSION:

As a result of the foregoing, it is asserted by Applicants that claims 1-18 and 26-30 in the Application are in condition for allowance, and Applicants respectfully request an allowance of such claims. Applicants respectfully request that the Examiner call Applicants' attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining issues.

Respectfully submitted,

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